

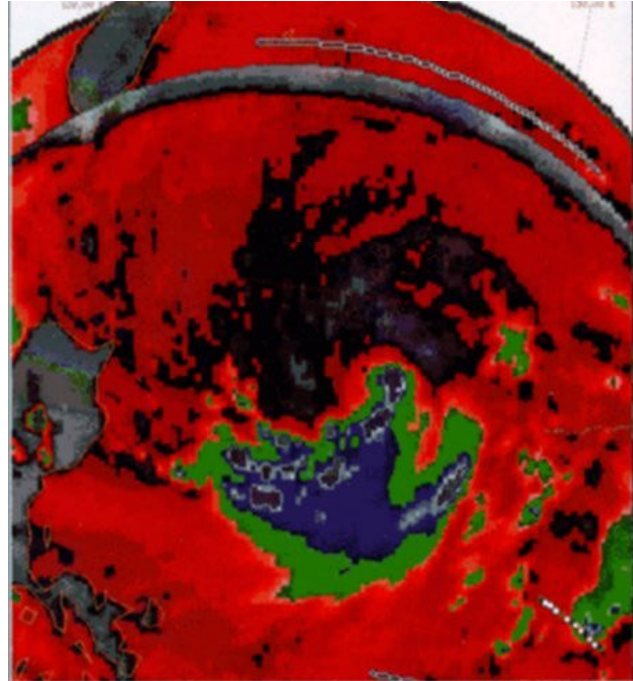
## TYPHOON PETER (09W)

### I. HIGHLIGHTS

One of three typhoons to develop in June, Typhoon Peter (09W) achieved only minimal typhoon intensity. The cyclone moved on a northward track nearly 900 nm (1665 km) before recurving. It made landfall near Sasebo, Japan, paralleled the mountainous spine of Honshu, and eventually became one of the most intense extratropical cyclones of the year.

### II. MOVEMENT AND INTENSITY

Typhoon Peter (09W) developed from a disturbance that was first detected early on the morning of 19 June as an area of persistent convection at the eastern edge of the monsoon trough, about 300 nm (560 km) southeast of Guam. This area, mentioned on the Significant Tropical Weather Advisory (ABPW) on 20 June, had characteristics of a monsoon depression with most convection on the south and east peripheries. After two days of slow development, deep convection began to consolidate near the center. As a result, the first Tropical Cyclone Formation Alert (TCFA) was issued at 0400Z on 22 June and a second TCFA was issued 24 hours later. However, when ERS-2 and NSCAT scatterometer-derived winds became available a short time later, the first warning was issued on Tropical Depression 09W at 0600Z on the 23rd. Scatterometer data played a critical role in ascertaining the cyclone's location and intensity throughout its life (see the discussion section). The developing cyclone spent its first four days on a west-northwest track, except for a temporary stair-step to the northwest on 20 June. Scatterometer wind data was again valuable as it indicated that the depression reached tropical storm intensity at 1200Z on the 23rd. By 24 June, a mid-tropospheric ridge had built to the southeast of Peter. This ridge imposed southerly steering, causing the tropical cyclone (TC) to take a sharp northward turn. Peter maintained this track for three days, covering about 900 nm (1665 km). On 25 June, conventional satellite imagery indicated that Peter was moving to the northeast, but microwave imagery data (SSM/I) revealed that the low level circulation center (LLCC) was maintaining a northward motion (Fig. 3-09-1). On 260600Z, Peter was upgraded to typhoon. It maintained a 65 knot (33 m/s) intensity for 36 hours, but developed no further. While tracking northward, Peter accelerated from an average speed of 10 kt (19 m/s) to 20 kt (38 m/s). Late on 27 June, Typhoon Peter began to weaken and turn northeastward. At 1800Z, on the 27th, Peter passed over

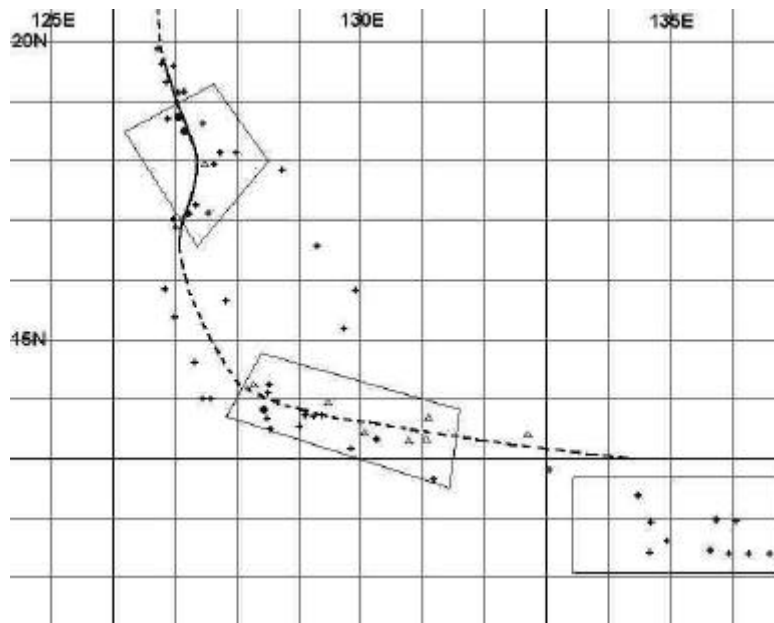


**Figure 3-09-1.** 251023Z June 1997 microwave image of Tropical Storm Peter (09W).

Nagasaki, Japan (WMO 47817) with 55-kt (29-m/s) 1-minute average sustained winds. Peter traveled to the northeast along the mountainous spine of Honshu and, less than one day after landfall, had nearly traversed the entire country from the southwest to the northeast. At 1900Z on the 28th, the weakened tropical storm entered the Pacific Ocean near Sendai (WMO 47590). On 29 June, Peter merged with a frontal system and completed its extratropical transition. As an extratropical system, the remnants of Peter became more intense than the system had been as a tropical system, reaching an intensity of 70 kt (36 m/s) on 30 June. It eventually weakened, and could no longer be found by 04 July.

### III. DISCUSSION

Microwave and scatterometer data was used extensively to track and to ascertain the intensity and wind distribution of Peter. Figure 3-09-2 shows the scatterometer derived winds used to justify the issuance of the first warning on Tropical Depression 09W and then, later, to upgrade it. Scatterometer data was gathered from both the European Research Satellite (ERS-2) and the joint US-Japan Adobe satellite (N-Scat). The ERS provided a single swath of data, while the N-Scat provided dual swaths. Unfortunately, the N-Scat instrument ceased operation late in 1997. Figure 3-09-1 illustrates the value of microwave imager data in locating the center of a TC where the center is obscured by clouds. Both visual and infrared imagery from 1800Z on the 24th through 1800Z on the 25th suggested that Peter was moving to the northeast. However, microwave data allowed the analysts to confidently position the LLCC well to the west of the location indicated by conventional satellite imagery. Another data source became available when Peter moved within view of the Japanese weather radar network in the Ryukyu Islands, Kyushu, Shikoku, and Honshu.



**Figure 3-09-2.** Conventional satellite fixes (+), scatterometer fixes (Δ), and microwave imager fixes (●) superimposed along the best track of Peter. The significance of the three boxes is explained in the text in the Discussion Section.

### IV. IMPACT

Two American servicemen from Iwakuni Marine Corps Air Station were washed away in the high surf produced by Peter. At the Sasebo Naval Facility, damage was reported to be light. In port at Sasebo, the USS BELLEAU WOOD reported gusts to 54 kt (28 m/s), and the USS DUBUQUE measured gusts to 45 kt (23 m/s).

